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COOKER  
[Cho-ri so-chi]

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## 1. Title

Cooker

## 2. Claims

(1) A cooker is constituted so that in a heat chamber a heater and a circulation fan to send air to the heater are provided; that a steam supply path is formed at the exterior of the heat chamber so that the steam supply path is linked so as to generate a convection current between the interior of the supply path and the heat chamber; and that steam from a steam generator is supplied midway in the steam supply path.

(2) The cooker, as described in Claim 1, is characterized by the fact that an outflow opening of the steam supply path is provided so that it is positioned at the air intake side of the circulation fan.

(3) The cooker as described in Claim 1 is characterized by the fact that at the upper part of the heat chamber, a sectioned hot-air path is formed of a metallic or heat-resistant insulating material; that a heater and a circulation fan are provided to this hot-air path; and that an air-intake opening of the hot-air path is positioned at the outflow opening of the supply path.

(4) The cooker as described in any of Claims 1 through 3 is devised so that during the operation of the circulation fan, steam is supplied intermittently.

## 3. Detailed Explanation of the Invention

This invention pertains to a new cooker, which is designed to expand

\* Numbers in the margin indicate pagination in the foreign text.

the scope of cooking by adding a steam supply function to a cooker, which is constituted so as to make hot-air circulate in the heat chamber.

This invention is explained below referring to one exemplary embodiment as shown in the figures. In Figure 1, (1) represents the main body of a heating apparatus, which is equipped with an outer case (2) which forms the outer shell and a heating box (4) in which a heat chamber (3) is formed. (5) represents a turn table which is provided at the lower part in the heat chamber (3) and is rotated at a speed of several rotations per minute through a driving shaft (5A) by a turn table driving motor (6) which is provided at the bottom part of the main body (1). (7) represents a magnetron which supplies high frequency waves into the heat chamber (3) through a waveguide (8); (9) represents a high frequency wave supply opening; (10) represents a lamp which illuminates the interior through small side holes of the heat chamber (3); (12) represents an airtight water tank which is installed in the main body (1) so as to be detached freely. (13) represents a vaporization chamber in which an electronic heater (14) is provided at the bottom part, and which is 7390 fixed to the water tank (12) via a saucer (15) and a pipe (16) so that water is supplied from the water tank (12) to constantly maintain a set water level.

(17) represents a circular electric heater which is provided to the bottom part in the heat chamber (3) so as to surround the driving shaft (5A); (18) represents a guide frame having a U-shaped vertical cross section, which is provided to the upper center in the heat chamber (3) or at a position to cover the lower part of the supply opening (9), which

is made of a metal or a heat resistant insulating material such as porcelain, and in which an exhaust opening (19) is pre-formed at the lower part which corresponds to the supply opening (9). (20) represents an air intake opening which is formed between the opposite end of the guide frame (16) to the exhaust opening (19) and the ceiling surface of the heat chamber (3); (21) represents a guide part which is formed at the tip of the guide frame (16) at the side of the exhaust opening (19) of the guide frame (16); (32) represents a heater which is prearranged in the guide frame (16), and has multiple heat exchange ventilating holes (23) which are provided to the entire surface.

(24) represents a circulating fan which is rotated by the driving shaft (26) of the motor (25), which is provided so as to vertically pass through the waveguide (6) and is placed at the entry part of the air-intake opening (20) of the guide frame (16). (27) represents a case for this circulating fan, which is provided with a jet opening (28) at its one end part and an inlet opening (29) at its lower center surface.

(30) represents a heat-resistance cover which covers the supply opening (9); (31) represents a through hole which is provided to one side surface of the heat chamber (3) and is lower than the part corresponding to the turn table (5); (32) represents a through hole which is similarly provided to the side surface of the heat chamber (3) and is near to and lower than the circulation fan (24); (33) represents a metallic supply pipe which is provided to the exterior part of the heat chamber (3), in which its inner space is used as the steam supply path (8), and its inflow opening (34) and outflow opening (35) are respectively linked to the rims

of the through hole (31) and through hole (32) of the heat chamber (3).

(35) represents a discharge pipe which is provided so as to pass through the bottom surface of the supply pipe (33) and so that its lower end part meets the interior of the vaporization chamber (13). (37) and (38) represent exhausting holes which are provided to the ceiling surface of the heat chamber (3) and the upper surface of the outer case (2); (39) represents an exhaust duct which links these exhaust holes and houses a temperature detecting part (40) of a cooking temperature adjusting instrument (not shown in the figures) which controls an electric current passing through the heaters (17), (22) and the motor (25).

With the above constitution, its operation is explained below. First, in order to cook only by high frequency wave heating, when the magnetron (7) is oscillated, high frequency waves are transmitted inside the waveguide (8) and irradiate inside the heat chamber (3) from the supply opening (9), heating and cooking the food placed on the turn table (5) efficiently.

Next, when an electric current is sent to the heater (17), the turn table (5) is heated from its underside, reaching a high temperature, heating the food placed on the turn table (5) from its lower side. Hence, if this is used in combination with high frequency wave heating, the food can be simultaneously cooked from both the inside and outside, making it possible to cook the food with little unevenness and in a short time.

Next, in any case in which an electric current is kept turned off or is intermittently sent to the heater (17), when an electric current is sent to the heater (17), since the circulating fan (24) is simultaneously

operated, air which is sucked in from the inlet (29) of the fan cage (27) becomes a warm air current when passing through the ventilating holes (13) of the heater (22), is guided downward at the guide part (21) of the guide frame (18) and is perted out downward from the exhaust opening (19).

Hence, with the jetted warm air current, the food on the turn table (5) is heated up from its surface, making it possible to slightly burn its surface, and at the same time, since the warm air current circulates in the hear chamber (3) as shown by an arrow indicating the flow in the figure, the atmospheric temperature in the hear chamber (3) gradually rises, making it possible to cook with a blast of hot air. While being cooked by the blast of hot air, when the food is irradiated by high frequency waves, the heating efficiency of the food is further improved.

Since the temperature detector (40) of the temperature adjuster (not shown in the figure) is placed inside the exhaust duct (39), it is needless to say, to control the transmission of the electric current to the motor (25) and the heaters (17) (22) so as to detect the hot air temperature in the heat chamber (3) and keep the atmosphere at a prescribed cooking temperature which is preset by the user.

Next, when an electric current is sent to the heater (13), a small quantity of water stored in the vaporization chamber (13) is rapidly heated and vaporized; from the top of the discharge pipe (36), steam is jetted upward in the supply path (8). In this case, if the atmospheric temperature in the heat chamber (3) is heated by the heater (13) to (12), steam of a much higher temperature is supplied into the atmosphere and fills the

heat chamber (3), making it possible to effectively heat and cook the food with the heated steam. As the steam is discharged from the steam supply path (5), the high temperature air in the heat chamber (3) flows into its interior from the inflow opening (74); hence, steam discharged from the discharge pipe (26) can be introduced efficiently into the heat chamber (3) without being cooled down. /331

Especially when the circulating fan (24) is operated, since the intake side of the circulating fan (24) is directly above the outflow opening (32), the steam can be effectively heated and concentrated, making it possible to discharge from the exhaust opening (19) of the guide frame (18), and at the same time a larger quantity of air flows into the steam supply path (5), making it possible to efficiently remove the steam.

While oscillating high frequency waves or while sending an electric current to the heaters (17) (22), if steam is intermittently supplied, it is possible to keep the food at the proper level of dryness during cooking by high-frequency heating; during the cooking by electrical heating, the hot air temperature is not lowered and the high temperature steam is applied to the food as is, making it most suitable, especially for cooking food which requires a higher moisture content.

Figure 2 depicts another exemplary embodiment of this invention, in which the shape of the guide frame (18) and the position of the outflow opening (35) are slightly different from those of the said exemplary embodiment and provide the same effects. The steam generating means is not limited to the constitution of the above exemplary embodiment.

As mentioned above, according to this invention, since it is devised

so that the cooking can be achieved by a hot-air blast and steam, and at the same time, a steam-generating device is joined with the interior of the heat chamber and the supply path which forms the circulating path, one can expect such effects that the generated steam can be efficiently supplied to the heat chamber, making it possible to perform various kinds of cooking in a short time.

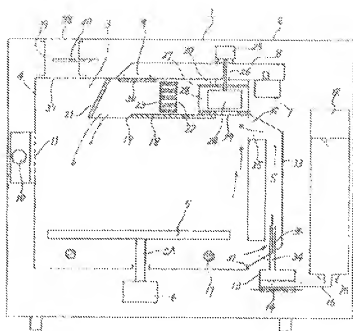
#### 4. Brief Explanation of the Figures

Figure 1 is a vertical cross section of the center of a cooker which depicts one exemplary embodiment of this invention. Figure 2 is a vertical cross section of the center of a cooker which depicts another exemplary embodiment of this invention.

In the figures (1) represents a main body; (3) represents a heat chamber; (13) represents a vaporization chamber; (14), (17) and (22) represent heaters; (18) represents a guide frame; (24) represents a circulating fan; (31) represents an inflow opening; (sic) (32) represents an outflow opening; (33) represents a supply pipe; (6) represents a supply path.

In the figures, the identical symbols indicate identical or equivalent parts.

[Figure 1]



[Figure 2]

